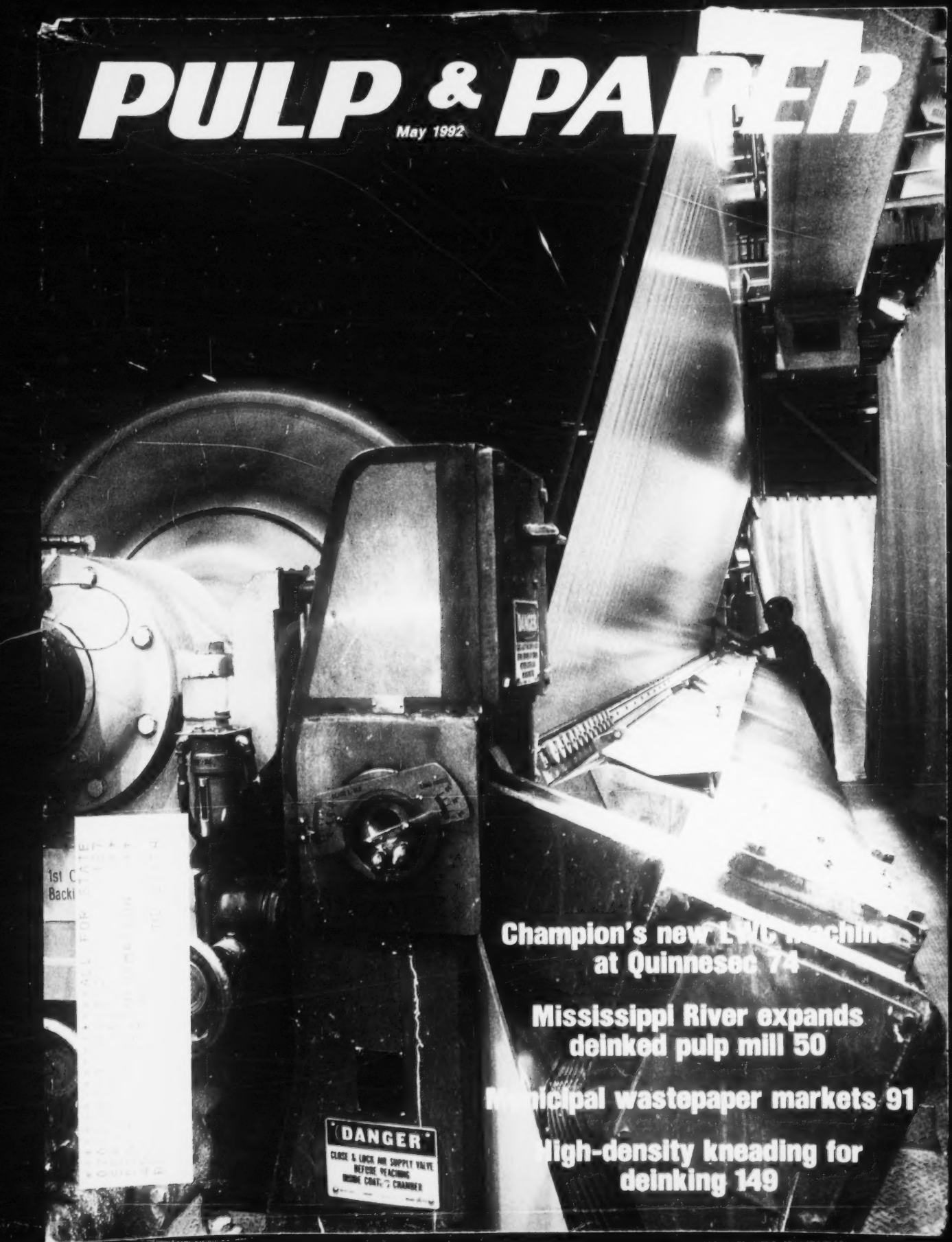
PULP & PAPER

May 1992



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Atlanta: 2000 Powers Ferry Center, Suite 450 Marietta, Ga. 30067; (404) 952-1303; Fax (404) 933-0666
Chicago: 6160 N. Cicero Ave., Suite 122, Chicago, Ill. 60646; (312) 545-0700; Fax (312) 545-9994
San Francisco: 600 Harrison Street, San Francisco, Calif. 94107; (415) 905-2200; Telex 278273; Fax (415) 905-2240
New York: 370 Lexington Avenue, New York, N.Y. 10017; (212) 683-9294; Telex 220442; Fax (212) 725-0915
Etna, Maine: (207) 269-2494
Brussels: Chaussée de Charleroi 123a, Boite 5, B-1060, Brussels, Belgium

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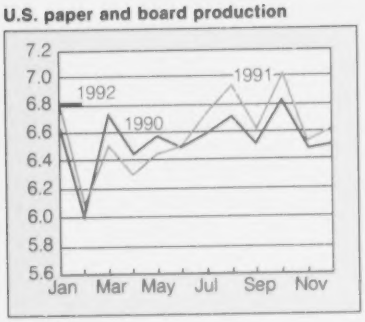
ABP

BPA

un A United Newspapers publication

U.S. paper and board production



U.S. production of paper and paperboard totaled 6.8 million tons in January, down 0.2% from the same month last year, according to the American Paper Institute. Paper production was off by 1.4% from January 1991, while paperboard output exceeded its year-earlier mark by 0.9%. Paper continued its six-month downward trend, and the trend rate for paperboard dipped sharply from December 1991 after a steady series of increases that began last May.

Among major grades, printing and writing paper shipments were off 4.2% in January, hurt by weakness in commercial printing and magazine advertising. Business papers showed smaller declines. Containerboard production for export was down 5.8% in January, offsetting a 2.1% increase in output for the much larger domestic market. Overall, containerboard posted a 1.4% increase for the month. Inventories of containerboard rose 12% from December 1991 to January 1992 but were off 3.6% from a year earlier.

Canadian newsprint shipments totaled 662,000 metric tons in January, down 13.6% from January 1991. Woodpulp shipments climbed 0.3% to 615,000 tons. Canadian producers began the year with operating rates of 80% for newsprint mills and 90% for pulp plants. ■

	Latest month (000 short tons)		% change from year ago	Annualized year-to-date (000 short tons)	% change from year ago
PAPER & PAPERBOARD PRODUCTION[1]					
Newsprint	Jan.	607	5.4	7,285	5.4
Uncoated groundwood (s)	Jan.	128	-11.7	1,536	-14.6
Coated paper (s)	Jan.	597	-5.8	7,165	-5.8
Uncoated free-sheet (s)	Jan.	969	-1.4	11,624	-1.8
Other printing/writing	Jan.	119	-6.3	1,433	-8.0
Total packaging and other paper (s)	Jan.	397	2.3	4,759	1.9
Tissue	Jan.	480	-1.0	5,760	-1.1
Total paper	**Jan.**	**3,297**	**-1.2**	**39,562**	**-1.4**
Unbleached kraft paperboard	Jan.	1,841	1.0	22,092	1.0
Semichemical medium	Jan.	505	1.2	6,062	1.3
Bleached paperboard	Jan.	365	-6.6	4,376	-6.8
Recycled paperboard	Jan.	799	4.2	9,588	4.2
Total paperboard	**Jan.**	**3,510**	**0.9**	**42,119**	**0.9**
Total U.S. paper and paperboard output	**Jan.**	**6,807**	**-0.2**	**81,681**	**-0.2**
PULP, WASTEPAPER & FIBER[2]					
Total U.S. woodpulp production	Jan.	5,681	1.8	68,166	1.8
Market pulp production	Jan.	845	10.6	10,147	11.2
Wastepaper consumption at paper/board mills	Jan.	2,029	11.7	24,346	7.4
Pulpwood consumption (cords)	Dec.	8,006	-0.1	98,242	-0.9
CONVERTED PRODUCTS STATISTICS[3]					
Corrugated box shipments (billion ft²)	Jan.	28.934	5.5	28.934[6]	5.5
Containerboard inventories at U.S. box plants and mills	Dec. 31	2,670	-3.4		
INTERNATIONAL TRADE[2]					
U.S. paper imports (including products)	Dec.	937	-3.2	12,074	-7.2
Imports of Canadian newsprint	Dec.	564	-8.0	7,380[6]	-9.1
U.S. paper exports (including products)	Dec.	701	34.0	8,311	22.5
Exports of unbleached kraft linerboard	Dec.	259	28.9	3,027	16.9
Exports of woodpulp	Jan.	514	8.2	6,165	8.1
Norscan pulp inventories[4]	Jan. 31	1,369	-9.5		
Norscan pulp operating rates[4]	Jan.	91%	85%	85%	87%
CANADIAN STATISTICS[5] *(reported in metric tons)*					
Total newsprint shipments	Jan.	662	-13.6	662[6]	-13.6
Operating rates	Jan.	80%	95%	80%	95%
Inventories held by U.S. consumers	Jan. 31	1,290	-5.6		
Other paper/board shipments	Jan.	615	0.7	615	0.7
Woodpulp shipments (export only)	Jan.	693	0.3	693	0.3
Operating rates	Jan.	90%	89%	90%	89%

1. American Paper Institute. 2. API, Bureau of Census, American Pulpwood Assn. 3. Fibre Box Assn., Paperboard Packaging Council. 4. North American/Scandinavian paper-grade market pulp. 5. Canadian Pulp & Paper Assn. 6. Not annualized. (s) = Shipments.

Coated groundwood: Major markets continue economic retrenchment

Grade structure: Coated groundwood papers are generally accepted as paper with 10% or more mechanical pulp. Coated groundwood is often referred to as lightweight coated (LWC), though basis weights for LWC are typically 40 lb or less (sometimes 45 lb), and basis weights of coated groundwood grades can go higher. Most coated groundwood is coated two side (C2S). Coated groundwood papers represented 55% of all U.S. coated paper shipments in 1991, down slightly from 1990 because of large increases in coated free-sheet capacity.

Most coated groundwood paper is classified as Nos. 4 and 5. Half of No. 4 papers produced is groundwood and all but a few thousand tons of No. 5 is groundwood. No. 5 papers make up about 49% of the total U.S. coated paper produced. Slightly more than 15% of total Canadian printing/writing papers production (uncoated groundwood, uncoated free-sheet, and coated) is coated paper. Coating weight is approximately 30% of total sheet weight for LWC papers.

Coated groundwood papers are commonly made in the 32-to-50-lb range (25 × 38 in. in reams of 500), although basis weights can run as low as 26 lb and as high as 70 lb. The two major end uses are commercial printing and magazines, followed by catalogs, Sunday newspaper supplements, newspaper advertising inserts, directories, and books.

Magazine and catalog publishers have been asking for lower basis weight papers (32 lb is popular in weekly newsmagazines) to offset higher mailing costs, and more are looking at using recycled grades. In fact, Time Warner has converted three of its magazines to recycled-content paper from various suppliers. Last year, U.S. mills lost their dumping complaint against European mills, some of which have excess capacity in coated groundwood paper and the competing supercalendered papers.

Production/capacity: The top ten coated groundwood producers represent almost 90% of North American capacity. The five largest coated groundwood producers are Champion International Corp., International Paper Co., Consolidated Papers, Repap Enterprises Inc., and Bowater Inc., which acquired Georgia-Pacific Corp.'s Great Northern Div. in Maine last year. U.S. coated groundwood capacity is projected by the American Paper Institute to rise just 3% in the 1991-94 period when it will reach over 4.5 million tons, a drop in the estimate from the previous capacity survey. The next major addition is not likely until 1994, when Boise Cascade Corp. may start up a new machine at Rumford, Maine. Bowater may convert some additional capacity in Maine to coated in the meantime.

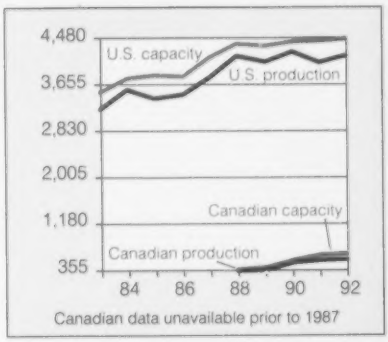
Canadian coated groundwood capacity will increase from 419,000 short tpy in 1989 to about 661,000 tons in 1992.

Outlook: Magazine publishers and printers purchase about 50% of the total coated groundwood paper produced in the U.S. But the continued shakeout in general interest magazines, along with reductions in catalog printing caused by business failures and higher postal costs, have eaten into coated groundwood profits. Magazines and periodicals may not recover advertising revenue until 1993. Newspaper supplements also suffered the same fate.

Magazine publishers expect to cut overall paper use, according to the annual paper survey by the Magazine Publishers of America (MPA). Total paper tonnage used by magazines dropped 4.1% to roughly 1.587 million tons in 1991 from 1.656 million tons in 1990. The drop in 1992 is forecast at 0.3%. Coated groundwood papers represent about 66% of total magazine paper use in 1991, but declined in use 4.7% in 1991 and will gain back only a meager 0.6% in 1992.

Prices: Historical transaction pricing trends ($/short ton, year-end) for 34-lb No. 5 roto paper are as follows: 1987, $890; 1988, $990; 1989, $966; 1990, $940; 1991, $880. ■

SUPPLY/DEMAND (000 tons)



Canadian data unavailable prior to 1987

FORECAST (000 tons)

U.S.	1990	1991r	1992e
Production[1]	4,233	4,044	4,165
Capacity[2]	4,414	4,426	4,463
Utilization rate	95.9%	91.4%	93.3%
Imports	665	650	673
Exports	140	150	157
Apparent U.S. consumption	4,758	4,544	4,681
lb/capita	38.07	35.97	36.78
GDP ratio[5]	0.97	0.94	0.94
Canada			
Production[1]	501	543	559
Capacity[3]	546	636	661
Utilization rates	91.8%	85.4%	84.6%
Exports[1,4]	561	583	600

r=Revised. 1. *Pulp & Paper* estimates. 2. American Paper Institute. 3. Canadian Pulp & Paper Assn. 4. More than 95% shipped to U.S. 5. 000 tons/billion $ real GDP.

TOP NORTH AMERICAN PRODUCERS

	Annual capacity (000 tons)	Market share (%)
1. Champion International	715	13.8
2. International Paper[1]	610	11.7
3. Consolidated Papers[1]	615	11.8
4. Repap Enterprises	600	11.5
5. Bowater[2]	480	9.2
6. Blandin Paper[3]	421	8.1
7. Boise Cascade	390	7.5
8. Mead	310	6.0
9. James River	260	5.0
10. Pentair[4]	220	4.2

Total North American capacity (1992):
5.198 million tons
U.S.: **4.533 million short tons**
Canada: **645,000 short tons**

Capacity share of top five companies:
58.1%
Capacity share of top ten companies:
88.9%

1. *Pulp & Paper* estimate. 2. Includes Great Northern Paper Inc. 3. Subsidiaries of Fletcher Challenge Canada Ltd. 4. Niagara, Wis.

Mississippi River Corp. Starts Up Idled Mill to Produce Deinked Pulp

Former molded pulp mill in Natchez, Miss., is currently adding a third deinked market pulp line for a total capacity of 270 tpd

By KEN L. PATRICK, Editor in Chief

By mid-summer, Mississippi River Corp. will bring its third 90-tpd deinked market pulp line onstream at Natchez, Miss. Together with similar 90-tpd lines started up in December 1990 and June 1991, MRC will then have the capacity to produce 270 tpd of high-quality market pulp from deinked wastepapers. A fourth 90-tpd line is scheduled for startup in the fourth quarter of this year.

North American Paper Co., a pulp broker in Worthington, Ohio, and a sister company to MRC (same stockholders but operated as separate corporations), bought the mill in 1990 from American Tissue Corp., which had planned to make tissue products there. Prior to American Tissue's acquisition, Diamond International Corp. produced recycled molded pulp products at the southwestern Mississippi plant for approximately 17 years, ceasing operations in 1983.

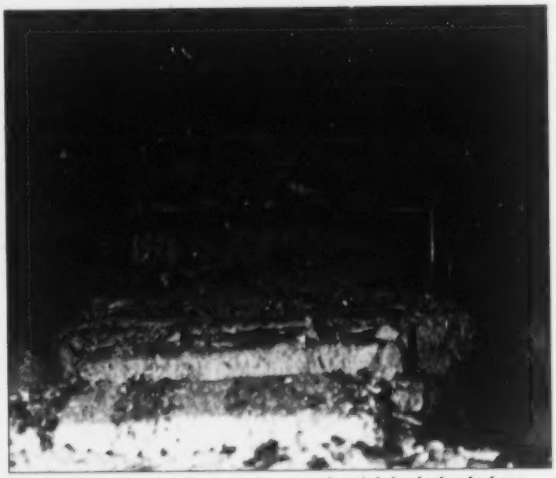
The 83-plus GE-brightness pulp currently produced at MRC is targeted primarily for use in printing and writing papers and coated publication grades. It is marketed basically as a hardwood pulp, but contains as much as 30% softwood fibers. Average dirt count is 5 or less, and the ash content is typically 3% or less. Canadian Standard freeness averages 475 or higher. No groundwood fibers are used in the process.

Engineering and construction was handled by MRC. The mill has an operating staff of about 75, with some 12 being management, supervisory, and office personnel.

FIBER SUPPLY. According to George Matthews, vice president and chief operating officer, the mill receives a broad range of nongroundwood-containing wastepapers from a large geographical base generally east of the Mississippi River. MRC is also working with local collection groups to develop recyclable fiber in the immediate areas.

"North American Paper Co. is the guiding force behind the development of MRC. They have been in the secondary-fiber/high-grade wastepaper business for

Mississippi River Corp. restored the former Diamond International molded pulp mill in Natchez, Miss., to produce deinked market pulp. By the end of 1992, MRC will have four deinked pulp lines operating at the mill, producing 360 tpd.



MRC's groundwood-free wastepaper furnish includes ledger and mixed book and magazine papers, as well as other paper and paperboard printed with various inks, including laser and other "thermo-set" inks.

more than 50 years, and the Natchez mill was a natural adjunct to their existing operations. North American has been responsible for development of the raw material base for MRC. Also, since they sell prime, off-grade, and secondary-fiber products, they serve as the primary sales arm for MRC's deinked pulp," Matthews explained.

Groundwood-free wastepapers recycled at the mill include ledger and mixed book and magazine papers, as well as other paper and paperboard printed with various inks, including laser and other "thermo-set" inks. The final product is 100% deinked, with a high percentage of postconsumer content. "We tailor our grades to meet customer requirements, although we are not a speciality mill," Matthews said.

While explaining that most inks are removable in MRC's process, Matthews pointed out that some, such as ultraviolet (UV) inks, do represent a contaminant to the system. "We can use laser inks as long as we carefully control the amounts. When dealing with mixed office papers or office ledgers, you're going to get laser or thermographic ink content. We run our system by determining a recipe that meets all of our quality criteria and the customer's needs, but doesn't overdose the system," he emphasized.

MARKETING. According to Matthews, MRC's customer base is large paper mills across the spectrum of fine printing and writing grades, coated publication, and copy papers. The pulp is marketed as a recycled postconsumer component that is used with bleached virgin kraft fibers to produce a sheet with superior smoothness, strength, and printability characteristics.

"Recycled newsprint, corrugated containers, and other paperboard products have been on the market for some time now, but producers of the high-quality fine papers and publication grades are beginning to recognize that there is a growing market for recycled contents in these grades. While this market is still in its infancy, high-quality recycled pulps such as ours will help it to mature," Matthews pointed out. "In fact, the demand for recycled kraft pulp has spurred our two expansions and is the reason why we are now going ahead with the fourth deinking line later this year."

MRC is also selling some of its deinked pulp for use in coated basestocks, which is a growing market. The mill is also examining the potential for use in newsprint, but at this time, it is not actively marketing into the groundwood sector, although it has had discussions with some producers.

Matthews added that although MRC markets primarily to large printing, writing, and groundwood-free publication paper mills, it also has some smaller speciality-type mills in its customer base. "Some of our customers buy only one or two truck loads a month, and we are very comfortable with that. We are not trying to supply only the large volume customers. Our plans are to be a supplier of choice to a variety of customers."

Recycled groundwood-free pulp is currently attracting a healthy premium in relation to some virgin bleached chemical market pulp. However, Matthews said that MRC did not set their price in relation to charging a premium when the mill started up in December 1990.

"Demand for recycled market pulp was really not very strong when we started up, for several reasons. First, there were already several recycled pulps on the market and mills had been using them with varying degrees of success. Second, we targeted some very demanding applications, and many mills were somewhat reluctant to try recycled pulps because of some bad experiences.

"Modern paper machines, and especially coated pa-

TABLE 1: **Market deinked pulp producers—existing and proposed.**

Company/location	Deinking capacity (tpd)	Startup date
Ponderosa Fibres of Amer. Inc., Santa Ana, Calif.	150[1]	1966
Ponderosa, Augusta, Ga.	180[1]	1970
Ponderosa, Oshkosh, Wis.	250[1]	1972
Ponderosa, Memphis, Tenn.	240[1]	1974
Desencrage Cascades Inc., Breakeyville, Que.	110[1]	1986
Mississippi River Corp., Natchez, Miss.	90	1990
Mississippi River, Natchez, Miss.	90	1991
Newstech Recycling Inc., Coquitlam, B.C.	390[1]	1991
Mississippi River, Natchez, Miss.	180	1992
Kieffer Paper Mills Inc., Brownstown, Ind.	110	1992
EcoFibre Inc., DePere, Wis.[2]	—	1992
Fox River Fibre Co., DePere, Wis.	220	1992
Cascades Inc., Cap-de-la-Madeleine, Que.	330	1992/93
Minnesota Pacific, Port of Duluth, Minn.	200	1993
Superior Recycled Fiber, Duluth, Minn.	250	1993
Caithness King Co., Mich.	300	1993
American Power, Barrackville, W. Va.	400	1994
DeNovo/Southern Electric, Fredericksburg, Va.	150	—

1. Current capacity. 2. EcoFibre will provide a varying amount of this deinked pulp to its parent, Riverside Paper Corp.
Source: *Pulp & Paper Week.*

Ronnie Boles of MRC makes a final inspection of the 100% deinked pulp before shipment. The 83-plus GE brightness pulp is targeted primarily for use in printing and writing papers and coated publication grades.

per machines, can be very demanding, and it is extremely difficult to produce a recycled pulp that is going to perform well in these highly technical applications. Customer reactions to our trials often took six to eight weeks, i.e. before paper could be produced, sold, printed, and finally evaluated by the end user.

"The economics had to be analyzed, discussed, and examined in relation to the quantities that could be produced for various products, especially completely new product lines. Thus, the first three to four months of 1991 were used for developing the markets and feeling our way through our production capabilities. Actually, this development period continued through most of last year, although things have now become much faster and more efficient.

"We have been able to come as far and as fast as we have for one primary reason. From the first day of operation, we focused directly on quality, not quantity. We started up one line, got it right, then slowly and cautiously proceeded to the next. We established high standards immediately and often deliberately limited production to maintain those standards," Matthews emphasized.

BALE INSPECTION, HANDLING. The raw materials purchased are generally presorted and baled. The mill routinely inspects and tests bales to ensure they meet its demanding quality requirements. In handling wastepaper going into the process, operators will also sort and inspect for any potential contaminants, such as pieces of corrugated boxes, groundwood, plastics, wood, wire, glass, bindings, glues, etc.

"We believe the cornerstone of our operation is the careful selection of our supply sources, rigid inspection prior to introduction into our system, and testing during various stages of our production process," Matthews said. "This, in addition to state-of-the-art technology, ensures that we maintain our position as a producer of high-quality recycled pulp in the industry."

PROCESS DETAILS. The old Diamond International plant was basically intact when MRC took it over. But, initially, only about 30% of the 310,000-ft^2 building complex was usable. A high percentage of the existing Diamond International process equipment was restored or rebuilt. Piping had to be rerouted and portions of the process equipment reconfigured. In fact, the entire process segment following deinking had to be installed by MRC.

The deinking lines, according to Matthews, were installed by Diamond as an add-on facility during the 1970s. They were used at that time to deink old newspapers (ONP). Currently, they are operated as flotation units in conjunction with washing.

The two lines are not separate and distinct production lines. Two Black Clawson Hydrapulpers feed a single line, so two lines cannot be operated with different furnishes since they come together again at several different points. They have common sidehill screens, course screens, pressure screens, and cleaners, for example.

The mill uses a combination of several chemicals in its process. However, Matthews said they do not intend to use any chlorine or chlorine compounds in the system.

Furnish from the deinking operation is taken through several stages of dewatering, before being sent to the baler press. Final a.d. consistency is about 58%. The pressurized bales of fiber from the baler measure about 42 in. long × 30 in. wide × 40 in. high. Shipping is either by truck or railcar.

Furnish is tested periodically at various stages in the process. Samples are sent to the mill's laboratory on a continuous basis so that any quality-related problems can be located, identified, and corrected as soon as possible. The finished product quality is also carefully tested and monitored.

WASTE TREATMENT. Water discharges from the process are taken through a series of clarifiers and an aeration lagoon. Sludge from waste treatment, comprised mainly of inks, clay, and fiber, passes through a dewatering press before being sent to MRC's landfill. Currently, none of the clarified water is sent back to the process, but this is being considered for the near future.

Matthews reported that the State of Mississippi and the county have been extremely cooperative and helpful in the environmental area. Landfill and water discharge permitting has gone very smoothly.

Water for the mill's process comes from wells, and power is purchased from Mississippi Power & Light. ■

Wastepaper Market Evolving as Demand Changes Collection Infrastructure

Location and consumption patterns of mills will boost use of certain grades and require reliable supplies

By FRED D. IANNAZZI and RICHARD STRAUSS

Editor's note: This article is based on information contained in various reports published by Andover International Associates (AIA). All tons in this article are metric.

Major changes in the markets for recycled paper recovered by municipalities (old newspapers and old magazines) and by commercial establishments (old corrugated containers and office wastepaper) are projected over the next few years, according to Andover International Associates (AIA). These changes, in turn, will affect future regional planning for municipal solid waste (MSW) processing and disposal facilities.

Some of AIA's definitions of wastepaper differ from the typical definitions used by the industry. AIA includes inserts and flyers in with newspapers in the category of old newspapers (ONP), and catalogs are included with magazines in old magazines (OMG). In this way, AIA's figures reflect conditions encountered in the field by both collectors and users of recycled paper, and the categories are determined by what is actually obtained in municipal and commercial collections.

The effect of AIA's inclusion of other grades with ONP, for instance, is to increase the potential supply of ONP and reduce the percentage of ONP recovery as compared to other industry statistics that do not include inserts and flyers. Thus, AIA's U.S. recovery rate for ONP in 1991 was 42%, compared to the 52% recovery reported by other industry sources.

U.S. AND CANADIAN MARKETS FOR ONP. According to AIA's recently completed study of present and projected paper recycling facilities, "The Guide to Marketing Recycled Paper in North America: 1991, 1993, and 1995," 158 U.S. mills and 16 Canadian mills consumed about 5.4 million tons of ONP in 1991 (see Table 1). In this total of 174 mills, 15 mills each consumed 50,000 tpy or more of ONP, or a total of roughly 1.5 million tons.

Mr. Iannazzi and Mr. Strauss are with Andover International Associates, Danvers, Mass.

The remaining 3.9 million tons of ONP consumption was split among the remaining 159 mills, an average of about 25,000 tpy per mill.

Large and small ONP recycling mills differ in the quality of ONP and assurance of continuity of supply. Almost all the mills that consume 50,000 tpy or more of ONP are newsprint mills, while none of the mills that consume less than 50,000 tpy of ONP are newsprint mills. Smaller mills primarily produce paperboard—such as chipboard and clay-coated boxboard—or tissue. The quality of ONP used in these applications is generally not suitable for use in newsprint, which requires ONP with no dirt or other contaminants, or "junk mail" or other sources of uncoated free-sheet pa er. In addition, OMG will either be specifically accepted or excluded. A reasonable quantity of OMG is generally acceptable with the ONP in nonnewsprint applications.

In addition to the difference in ONP quality required by large and small mills, large mills draw from multistate areas and generally require relatively firm supply commitments, and small mills draw from local areas and generally purchase on an as-required basis.

The North American market for ONP will increase from 5.4 million tons in 1991 to 6.2 million tons in 1993 and to 8.4 million tons in 1995. Essentially, all the increases will be in new recycling facilities consuming 50,000 tpy or more of ONP. The products of the new large facilities will be newsprint, printing/writing paper, or market pulp—all applications that require higher-quality ONP. Thus, any new or expanding recycling programs must be prepared to provide high quality and a reliable supply of ONP.

TABLE 1: **North American markets for old newspapers.**

	1991	1993	1995
Total consumption (000,000 metric tons)	5.4	6.2	8.4
Number of ONP-consuming mills:			
U.S.	158	163	176
Canada	16	23	26
Total	174	186	203
Number of mills consuming 50,000 tpy or more of ONP:			
U.S.	12	17	29
Canada	3	10	15
Total	15	27	44

Source: Andover International Associates.

The locations of larger ONP-consuming mills will also change. Currently scattered geographically, most are located in or near major population centers. However, the major ONP-consuming mills projected to be installed between 1991 and 1995 are generally located at existing newsprint mills, remote from major population centers, and they will be primarily concentrated in a few regions: northeastern U.S./eastern Canada, U.S. Pacific Northwest, and southeastern U.S.

Clearly, the new mills (which will constitute more than half of the total market for ONP by 1995) will have to source much of their ONP from suppliers hundreds of miles from the mills. State and regional recycling coordinators, large paper dealers, and mill sourcing authorities will probably all participate in developing the required new marketing channels.

U.S. AND CANADIAN MARKETS FOR OMG. The growth trend in OMG through 1995 appears similar to ONP; however, on close inspection, both the supply and the demand situations for OMG are considerably more complex than for ONP. For instance, the lack of a consensus definition of OMG complicates matters.

In 1991, 88 mills in the U.S. and Canada consumed less than 0.5 million tons of OMG in total (see Table 2). Nine of these mills consumed 30,000 tpy or more of OMG, accounting for more than half of the total 1991 demand. The remaining 79 mills, mostly the same board mills that are the low-volume consumers of ONP, each averaged only about 2,500 tpy of OMG. Consumption of OMG is projected to increase from 0.4 million tons in 1991 to 1.1 million tons in 1993 and to 1.9 million tons in 1995. All of the increase will come from mills consuming 30,000 tpy or more.

Most of the new large consumers of OMG are newsprint mills, which use OMG in conjunction with ONP in deinking processes now being installed. These processes reportedly require an optimum OMG to ONP ratio of 30% : 70%. The "natural" overall composition of the U.S. home disposition stream is very close to this ratio, and, therefore, most existing or planned curbside OMG collection programs will collect the OMG commingled with ONP, said AIA.

Collecting OMG commingled with ONP is the ideal way to increase curbside collections by 40% with minimum additional cost or inconvenience. However, AIA lists some potential drawbacks to supplying the OMG commingled with ONP:

- Many ONP deinking facilities are working toward reducing the desired OMG to ONP ratio because the clay content of OMG is, in itself, a disposal problem. If a mill prefers to use an OMG to ONP ratio lower than 30% : 70%, commingled OMG/ONP will be a problem.
- Even mills using OMG and ONP in the 30% : 70% ratio may prefer to receive the two components separately because they wish to use different deinking process conditions for the ONP and the OMG.
- Four large existing recycled newsprint mills require ONP free of OMG. ONP with commingled OMG will continue to be excluded from this market.
- Nine of the 36 major OMG-consuming mills projected for 1995 will be making products other than newsprint, principally groundwood specialties (such as directory paper) and market pulp. In most cases, these mills will be using an OMG to ONP ratio of about 50% : 50% and, therefore, will have to blend separate streams of ONP and OMG or add OMG from another source to commingled OMG/ONP.

Mills that require OMG are not limited to sourcing from municipal curbside collections. A relatively clean, convenient source of "pure" OMG is available: magazine newsstand returns. Newsstand returns, plus preconsumer waste, supply virtually all the OMG presently used and can supply about half of the OMG required by 1995. OMG collected in municipal curbside programs will, in effect, compete with newsstand returns and preconsumer waste in many applications for OMG. In order to market OMG collected in curbside programs, municipal recyclers may have to consider supplying at least a portion of the OMG free of ONP, either by separating after collecting commingled ONP/OMG, or collecting and handling the OMG and ONP separately from source to delivery.

Future OMG-consuming facilities will be even more concentrated geographically than the ONP-consuming facilities. They will have to secure supplies from considerable distances; thus, they will prefer OMG which is not commingled with ONP, particularly newsstand returns. As in the case of ONP, marketing OMG to distant mills will probably require state and regional recycling coordinators, large paper dealers, and mill sourcing authorities to cooperate in developing new marketing channels.

U.S. AND CANADIAN MARKETS FOR OCC. In contrast to the markets for ONP and OMG, the market for old corrugated containers (OCC) is relatively mature and quite diversified geographically, and it operates virtually without municipal collection programs or recycling incentives. U.S. and Canadian OCC consumption is projected to increase steadily from 12.0 million tons in 1991 to 15.4 million tons in 1995 (see Table 3). Taking into account exports, the respective overall recovery rates are 55% in 1991 and 67% in 1995.

In 1991, 226 mills in the U.S. and Canada consumed OCC, and 54 of these used 75,000 tpy or more of OCC. The projected increase of about 3.4 million tons of OCC consumption between 1991 and 1995 will be accounted for primarily by the startup of 12 major new recycling facilities during that period, plus incremental increases in consumption by existing facilities. About 98% of recycled OCC is used to make containerboard and other recycled board products.

Existing OCC-consuming mills are geographically well diversified. Supply and transport systems are well established, and mills generally draw from relatively short distances. This situation will change, to some extent, by 1995 with a major increase in OCC recycling capacity in

the U.S. Southeast, which will draw large shipments of OCC from other regions.

Because the projected 67% recovery rate in 1995 will apparently approach the theoretical "maximum" rate (estimated at 70% to 75%), it is uncertain if municipal or state recycling coordinators should initiate or mandate additional OCC recovery programs. Experiences with municipal residential curbside or drop-off recovery programs for OCC to date have been less than satisfactory, and ample reasons suggest that collecting OCC from residential sources will not produce significant additional supplies in the foreseeable future.

The only significant underutilized sources of OCC are the relatively small retail/commercial establishments, according to AIA. These sources will eventually be tapped by commercial recyclers in the event of regional shortages of OCC. AIA believes that municipal recycling coordinators could assist or accelerate the process by publicizing the OCC recycling opportunity as a cost savings for local retailers, and possibly by acting in a voluntary coordinating role between the generators and the haulers. No direct or mandatory involvement by public authorities in OCC recycling seems necessary.

U.S. AND CANADIAN MARKETS FOR OWP. The market for office wastepaper (OWP) is presently "confused" by a glut of material and no abatement in the growth of additional voluntary office recycling programs. A major problem in analyzing the market for OWP and projecting future demand is the fact that there are at least two distinct markets for OWP, distinguished by the quality of the recovered paper. AIA characterizes the markets as either high-quality OWP (used for printing/writing paper, tissue, and market pulp) or low-quality OWP (used for paperboard products and packaging materials).

In 1991, 248 mills in the U.S. and Canada were consuming OWP. Of this total, 32 large mills consumed 30,000 tpy or more of OWP, accounting for about half of the total. The remaining 216 smaller mills averaged about 10,000 tpy. Present and future mills consuming OWP are relatively well dispersed geographically.

Low-quality OWP accounts for a little less than half of OWP consumption at present and is projected to increase very slowly through 1995. Because OWP in this market can be displaced by other grades of mixed wastepaper—or even by ONP—low-quality OWP use could actually decrease in the future if there were changes in the relative costs of the various grades of low-quality recycled paper. Low-quality applications clearly are not the best use for paper that can be recovered from offices.

The market for high-quality OWP, however, will remain almost constant through 1993 and then will more than double between 1993 and 1995 due to construction of 12 large new deinking facilities (tissue, printing/writing paper, and market pulp) and major expansions at several existing deinking facilities. Until the new deinking facilities are operating, though, demand for high-quality OWP will be limited by deinking capacity, independent of the success of attempts to create a market for printing/writing paper containing postconsumer recovered fiber.

TABLE 2: **North American markets for old magazines.**

	1991	1993	1995
Total consumption (000,000 metric tons)	0.4	1.1	1.9
Number of OMG-consuming mills:			
U.S.	78	82	94
Canada	10	16	21
Total	88	98	115
Number of mills consuming 30,000 tpy or more of OMG:			
U.S.	6	10	22
Canada	3	9	14
Total	9	19	36

Source: Andover International Associates.

TABLE 3: **North American markets for old corrugated containers.**

	1991	1993	1995
Total consumption (000,000 metric tons)	12.0	13.6	15.4
Number of OCC-consuming mills:			
U.S.	205	209	217
Canada	21	21	21
Total	226	230	238
Number of mills consuming 5,000 tpy or more of OCC:			
U.S.	46	50	58
Canada	8	8	8
Total	54	58	66

Source: Andover International Associates.

Through 1993, the entire requirement for high-quality OWP can be supplied by preconsumer waste. Consequently, no net present demand exists for the OWP being collected rather laboriously at in-office segregation programs. This situation will persist until 1995, at which time the demand for high-quality recycled printing/writing paper will significantly exceed the supply of preconsumer waste, and a firm market for high-quality OWP will develop, according to AIA.

Because OWP is collected by commercial haulers rather than by municipal curbside collections, municipal recycling authorities have no direct involvement in whether collected paper is recycled or dumped. Even active attempts by recycling authorities to promote recycling at this time have a more symbolic than real effect due to the fact that OWP demand will not develop until new deinking capacity is installed.

However, when a significant market for high-quality OWP develops, municipal and state recycling coordinators can play a useful role in matching the quality of OWP collected to the requirements of the consuming mills. For a number of reasons, coordinating supplier and consumer will be more difficult with high-quality OWP than with other grades of wastepaper:

- The actual specification requirements for high-quality OWP will depend upon the end product for

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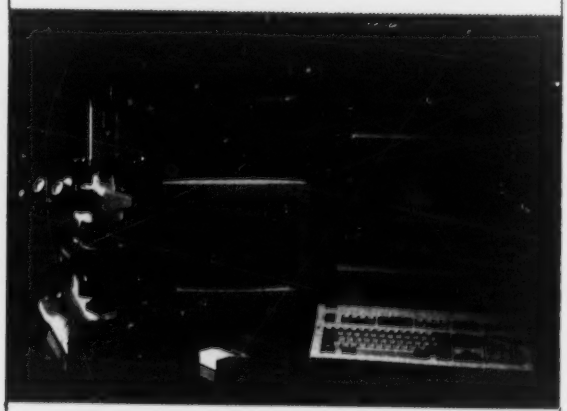

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which it is intended. Acceptable and unacceptable constituents of high-quality OWP will differ for the printing/writing paper, tissue, and market pulp applications. Even within any one of these end uses, the specific requirements will depend upon individual mill needs (the quality of paper produced and the exact nature of the deinking process).

- To deliver a grade of high-quality OWP specific to mill requirements, it is much more economical to collect recycled paper in the quality required (source segregated) than to collect with undesirables and subsequently sort.
- A single large OWP-consuming mill (100,000 tpy of OWP, for example) will need to draw its supply from a number of large municipalities. Assuming 40% recovery of OWP—a relatively optimistic projection—the complete OWP recovery from municipal areas totaling almost 5 million population will be required to supply a single large mill, according to AIA.

When significant quantities of high-quality OWP are required, it will be a formidable task to coordinate in-office recycling programs and the collection of OWP by commercial haulers from several large municipalities to reliably deliver uniform quality OWP to the mills. Clearly, municipal, state, and regional recycling coordinators will play an important role in facilitating this process.

IMPACT OF PAPER RECYCLING ON MSW. The consumption of recycled paper by U.S. and Canadian mills will increase by about 11.4 million tons from 1991 to 1995. Because paper consumption in North America is projected to increase by about the same amount over that time period, no significant change will occur in the quantity of wastepaper disposed of in municipal solid waste (MSW).

Public authorities planning future incinerator and landfill facilities must take into account the projected leveling of the wastepaper load in MSW, rather than assuming that it will continue to increase as in the recent past. We have already had reports of municipal incinerators starved for fuel and municipal landfill fees dropping as a result of implementation of paper recycling programs. An increase in consequences of this type in the future are to be expected as the market for recycled paper increases dramatically. In particular, the planning for new incineration capacity should take into account the reduced fraction of wastepaper in MSW, which we can confidently project from the repulping and deinking capacity now in the pipeline, according to AIA. ■

TABLE 4: **North American markets for office wastepaper.**

	1991	1993	1995
Total consumption (000,000 metric tons)	3.8	4.3	7.9
High quality	2.1	2.5	5.2
Low quality	1.7	1.8	2.1
Number of OWP-consuming mills:			
U.S.	222	228	238
Canada	26	26	28
Total	248	254	266
Number of mills consuming 30,000 tpy or more of OWP:			
U.S.	27	33	43
Canada	5	5	7
Total	32	38	50

Source: Andover International Associates.

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